

Claims:

1. An optical scanning system comprising:
a resonant oscillating device having a first magnetic field and a mirrored surface;
a first light source for directing a first beam of light to the mirrored surface of the
5 resonant oscillating device to provide a first reflected scan beam;
a second light source for directing a second beam of light to the mirrored surface of
the resonant oscillating device to provide a second reflected scan beam, the
second reflected scan beam being offset a first distance from the first reflected
scan beam; and
10 a second magnetic field for interacting with the first magnetic field to provide torque
to the resonant oscillating device for scanning the first and second reflected
scan beams across a surface to provide first and second scan lines on the
surface substantially simultaneously as the resonant oscillating device
oscillates under the influence of the first and second magnetic fields.
2. The optical scanning system of claim 1 wherein the first and second light sources
comprise a dual beam laser.
3. The optical scanning system of claim 1 wherein the surface comprises a
photoconductive drum.
4. The optical scanning system of claim 1 wherein the first and second light sources
further comprise first and second control systems for independent control of
the first and second light sources.
5. The optical scanning system of claim 1 for providing a third scan line spaced apart
from the second scan line a third distance and for providing a fourth scan line
spaced apart from the third scan line a fourth distance, wherein the second,
third and fourth distances are substantially equal to one another.
6. The optical scanning system of claim 1 wherein the first and second reflected scan
beams are scanned back and forth across the surface in two directions as the
resonant oscillating device oscillates.
7. The optical scanning system of claim 1 further comprising more than two light
sources producing more than two light beams.

8. The optical scanning system of claim 1 wherein the first magnetic field is provided by permanent magnets and the second magnetic field is provided by an electromagnet.

9. The optical scanning system of claim 1 further comprising a modulator for modulating the light beams based on input data and a print mechanism disposed to receive the light beams and produce images on media corresponding to the input data.

10. The optical scanning system of claim 1 further comprising a modulator for modulating the light beams based on input data and a recording mechanism disposed to receive the light beams and record information corresponding to the input data.

11. A scanning method comprising:

providing a resonant oscillating device having a first magnetic field and a mirrored surface;

5 providing a first light source for directing a first beam of light to the mirrored surface of the resonant oscillating device to provide a first reflected scan beam;

providing a second light source for directing a second beam of light to the mirrored surface of the resonant oscillating device to provide a second reflected scan beam, the second reflected scan beam being offset a first distance from the first reflected scan beam;

10 providing a second magnetic field for interacting with the first magnetic field for providing torque to the resonant oscillating device;

applying a current at a drive frequency to a coil creating the first magnetic field to cause the resonant oscillating device to oscillate at or near a resonant frequency as the resonant oscillating device is illuminated by the first and
15 second light sources thereby providing first and second reflected scan beams; and

scanning the first and second scan beams across a surface to provide first and second scan lines on the surface substantially simultaneously as the resonant oscillating device oscillates under the influence of the first and second
20 magnetic fields.

12. The method of claim 11 further comprising providing multiple sets of dual scan lines across a surface wherein each set of dual scan lines is spaced apart from an adjacent set a distance substantially equal to the second distance.
13. The method of claim 11 further comprising scanning the first and second reflected scan beams back and forth across the surface in two directions as the resonant oscillating device oscillates.
14. The method of claim 11 further comprising providing multiple sets of N scan lines across a surface wherein each set of N scan lines is spaced apart from an adjacent set a distance substantially equal to the spacing of each N scan lines at the image surface.
15. The method of claim 11 further comprising scanning N reflected scan beams back and forth across the surface in two directions as the resonant oscillating device oscillates.
16. The method of claim 11 further comprising independently controlling the first and second light sources to provide the first and second scan lines on the surface.
17. The method of claim 11 further comprising applying the current to the first or second magnetic field at a frequency sufficient to provide an effective scan efficiency of the resonant oscillating device of at least about 50% while unidirectionally scanning the first and second reflected scan beams across the surface.
18. The method of claim 11 further comprising applying the current to the first or second magnetic field at a frequency sufficient to provide an effective scan efficiency of the resonant oscillating device of at least about 100% while bi-directionally scanning the first and second reflected scan beams across the surface.
19. A method of scanning comprising:
producing at least first and second laser beams and directing the laser beams in a desired direction;
oscillating the laser beams at a frequency at or near the resonant frequency of a mechanical system associated with the laser beams to produce oscillating first and second laser beams that move through first and second scan paths, respectively, each laser beam moving in a first direction and a second

- direction, the second direction being generally in the opposite direction to the first direction, and
- 10 directing the laser beams toward at least one target surface to produce at least first and second scan lines on the target surface.
20. The method of claim 19 further comprising the step of detecting at least one of the first and second laser beams with at least one sensor to determine the times at which the detected laser beam appears at a first location.
21. The method of claim 19 further comprising the step of detecting at least one of the first and second laser beams with a single sensor to determine the times at which the detected laser beam appears at a first location.
22. The method of claim 19 further comprising the step of detecting both the first and second laser beams with a single sensor to determine that the times at which the first and second laser beams appear at a first location.
23. The method of claim 19 further comprising the step of detecting at least one of the first and second laser beams with first and second sensors to determine the times at which the detected laser beam appears at a first location and a second location.
24. The method of claim 19 further comprising the step of detecting both of the first and second laser beams with first and second sensors to determine the times at which the first and second laser beams appear at a first location and a second location.
- 25 . The method of claim 19 further comprising the step of detecting the first laser beam with first and second sensors and detecting the second laser beam with third and fourth sensors to determine the times at which the first laser beam appears at first and second locations and to determine the times at which the second laser beam appears at third and fourth locations.
- 5
26. The method of claim 19 further comprising producing a plurality of laser beams, said plurality being greater than two.
27. The method of claim 19 further comprising the steps of:
- detecting at least one of the first and second laser beams with at least one sensor to determine the times at which the detected laser beam appears at a first location;

- 5 determining the direction of travel of the detected laser beam based upon the times at
 which the detected laser beam appears at the first location.
28. The method of claim 19 further comprising the steps of:
- detecting at least one of the first and second laser beams with at least one sensor to
 determine the times at which the detected laser beam appears at a first
 location;
- 5 determining the direction of travel of the detected laser beam based upon the times at
 which the detected laser beam appears at the first location;
- determining the time interval during which the first and second laser beams are
 traveling across an imaging window based upon the times at which the
 detected laser beam appears at the first location; and
- 10 modulating the first and second laser beams to produce imaging data on the imaging
 window.